

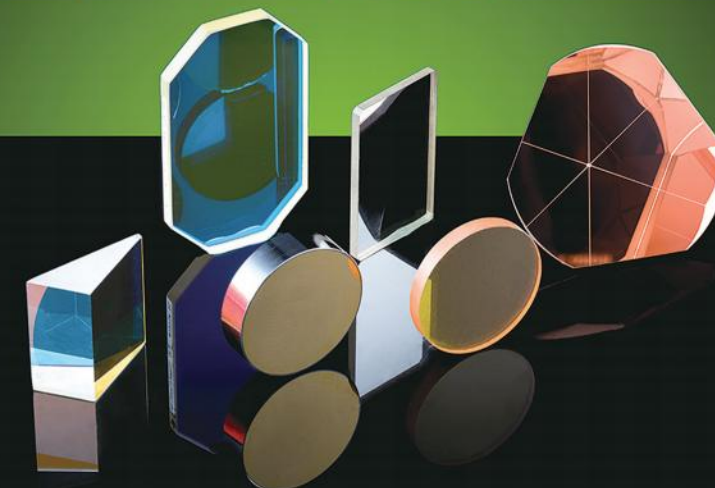
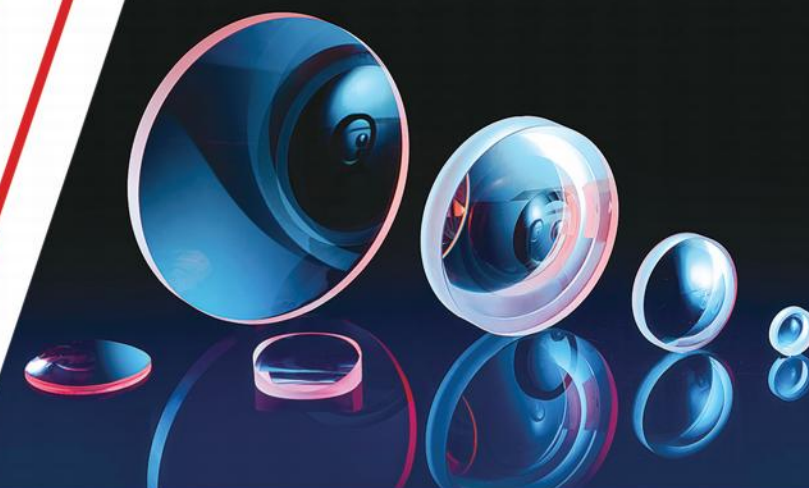


CHANGCHUN BOXIN PHOTOELECTRIC CO.,LTD.

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BOXIN



**SPECIALIZING IN
PRECISION
OPTICS**



Product Manual

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COMPANY INTRODUCTION

BOXIN is a private enterprise founded in 2001. It is a manufacturing company (NAICS 333314) who dedicate providing optical products and services for Machine Vision, Modern Industries, Scientific Research & Education, Laser Application, Medical Instrument and Automation Equipment. It is also a reliable strategic partner for the companies who engaged in product outsourcing and contract manufacturing of high-precision optical components. BOXIN products are sold all over the world and enjoy a good reputation in the field of optical industry at home and abroad.

BOXIN has more than 330 employees; covers 7,000m² with an 11,000 m² standard optical production workshop and ultra-clean workshop; owned over 500 sets of advanced processing equipment and inspection instruments.

BOXIN has formed a complete set of opto-electro-mechanical production chain, in order to provide the full service from design & development, to sample trial production, then to mass production. The annual optical elements output over millions of pieces.

BOXIN takes "continuous innovation, honesty & trustworthy, quality first and customer first" as the corporate philosophy, to provide best quality products and services to all customers!



BOXIN Workshop



BOXIN Production Workshop



Cylindrical Production Line



Micro Production Line



Spherical Production Line



Inspection Center



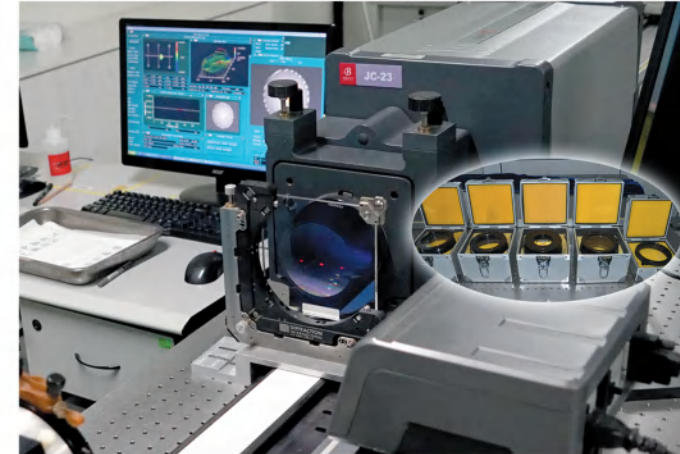
Spectrophotometer

BOXIN equipped with many Spectrophotometers. Among them, Agilent® Cary 7000 covers testing wavelength range from 190nm to 3300nm, it has higher accuracy and faster measurement speed features. It has multiple measurement modes and it's able to suit for different incidence angle measurements. Bruker® FIR spectrometer extend the measuring range to 20μm.



Trilinear Coordinates Measuring

BOXIN equipped with 2 sets of ZEISS® TCMM which can be used to measure the basic size, angle, distance of mechanical parts, tooling and irregular shaped parts, as well as the measurement of form and position tolerance and runout between selected elements. The measurement accuracy is up to $(2.6+L/300)\mu\text{m}$.



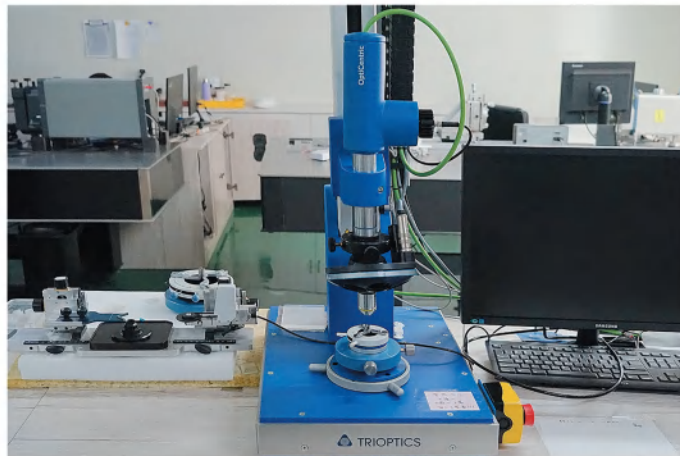
Laser Interferometer

BOXIN equipped with 3 sets of ZYGO® laser interferometers which can quickly conduct high-resolution measurement and data analysis of plane and spherical optical components, and can integrate and analyze the parameters of large-size parts. Resolution up to $\lambda/15$.



White Light Interferometer

BOXIN also equipped with ZYGO® white light interferometer which using a non-contact measurement method to detect the workpiece surface finesse from a variety of rough to ultra-smooth, and judge the workpiece roughness, flatness and micro-geometric profile and other measurement data from nano level to micron level.



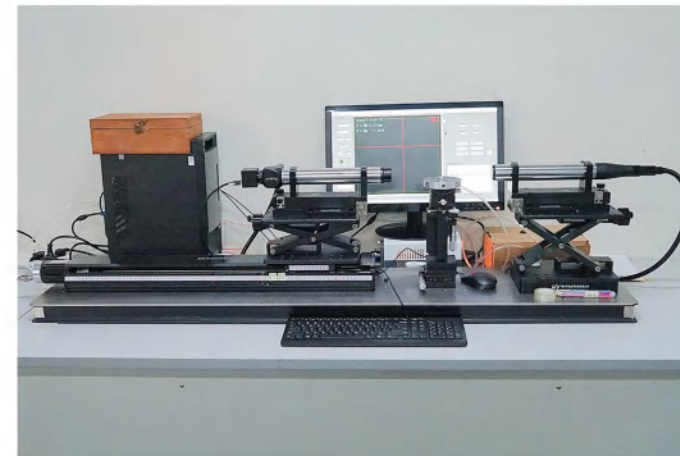
Multifunctional Centration Testing

The OptiCentric® equipped with Boxin can measure the centration of all kinds of lenses, and the accuracy of the centration measurement can reach 0.1-0.2μm. In addition, the device can also perform EFL measurement, BFL measurement, MTF measurement, and radius of curvature measurement.



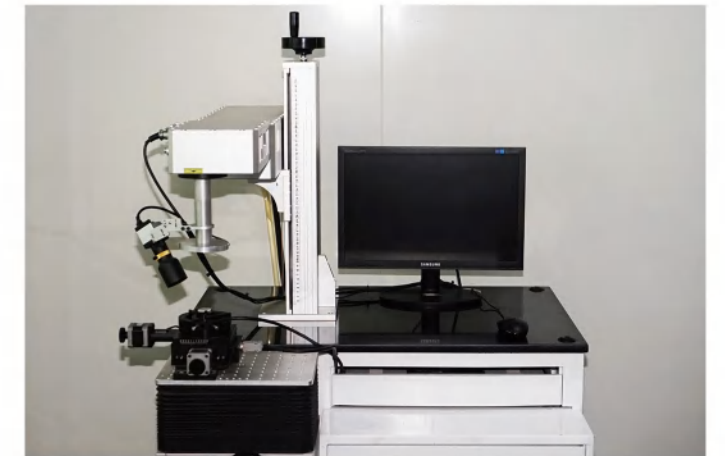
Contour Measuring Machine

The Mahr® Contour Measuring Machine equipped with Boxin can make high precision measurement of aspherical lens, with vertical resolution of 2nm and shape error less than 100nm, which ensures the reproducibility of aspherical products.



Digital Cylindrical Lens Centration Testing Device

The digital cylindrical lens centration testing device equipped with Boxin adopts a horizontal structure, which can efficiently and accurately measure the decenter, twist and tilt of cylindrical lens in a non-contact and no-damage way. The accuracy of the device centration testing can reach $\pm 1\mu\text{m}$.



Laser Induced Damage Threshold Testing Device

BOXIN equipped with LIDT testing device. It uses 1064nm water-cooled pulsed laser with adjustable laser power density to shoot laser radiation on the optical lens and film, and uses a high-power microscope to detect surface damage in order to calculate the damage threshold. The test range is from 10J/cm² to 400J/cm².



Cylindrical Lens

BOXIN cylindrical lens using automatic CNC equipments combining with latest German manufacturing technology, we can process all types of special cylindrical lenses including freeform. The processing range is 1200mm in length and 650mm in width. We could produce 2,000,000 pieces cylindrical lens annually, and our products are mainly supplying to Europe, America and Japan.



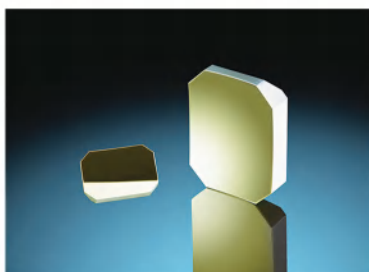
Aspherical Lens

BOXIN workshop equips with latest German-made Satisloh full automotive CNC aspherical lens production line and single point diamond turning lathe. Using Mahr profilometer as inspection instrument. We could process diameter range between 10mm to 750mm and the RMS can reach less than 12nm. The monthly capacity of single type aspherical lens is 100 to 1000 pcs. Target annual capacity is 150,000 pcs.



Large Dimension Optics

BOXIN large-dimension optical components are mainly used in printing machinery, astronomical optics, high luminous flux system, large field of view system, remote imaging system, scientific research, security and defense, etc. Boxin has more than 20 years of processing experience, specializing in the production of large-dimension optical components with 4 production lines: large-dimension plano/ spherical/ aspherical/ cylindrical lens. The maximum processing range can reach diameter of 1000mm, length of 1200mm, PV can reach $\lambda/10@800\text{mm}$.



Toroidal Lens

BOXIN is one of the best toroidal lens manufacturers in China; we equip advanced automatic toroidal lens production line. We are cooperating with many international enterprises and providing 150,000 pcs and more than 130 types of toroidal lens to our customers each year. Process range from 10mm to 300mm. Our product quality has acquired an excellent reputation.



High Precision Spherical Lens

BOXIN's high-precision spherical lens with common diameter below 300mm adopts German CNC milling and grinding, CNC polishing, Japanese high-speed polishing machines, and high-precision edgers for production. The lenses with a special diameter of very small or very large produced using the company's proprietary technology. The company is capable of producing lenses not only using various optical glasses and laminated lenses, but also lenses made of various artificial crystal materials, with an annual output of 700,000 pieces. The processing range is from 1.4mm to 1100mm.



Windows

In addition to producing conventional visible light materials, BOXIN can also process crystal materials such as calcium fluoride, zinc selenide, barium fluoride, zinc sulfide, germanium, monocrystalline silicon, and sapphire to produce high-precision mirrors and window components, with an annual output of nearly 500,000 pieces. BOXIN has large milling and grinding machine and polishing machine, as well as large ring polishing machines, separator polishing machines and double-sided polishing machines, which create conditions for the production of large components. The processing range is from 1.8mm to 1200mm.



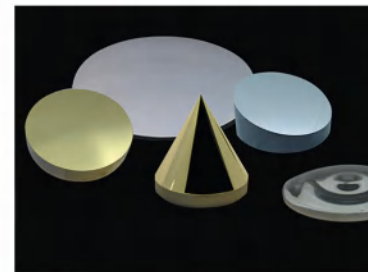
Prism

BOXIN's prism material range includes visible light materials, crystal materials, infrared materials, etc. The processing size range is from 3mm to 500mm. The types of prisms include glued prisms (up to glue 5 prism units together), roof prisms, grating prisms, Dove prisms, right-angle prisms, pyramid prisms, and various non-standard prisms. The minimum angle deviation is able to achieve 3".



Optical Coating

BOXIN's high-performance optical coatings can meet your complex application requirements. We specialize in designing, researching, and manufacturing high-performance optical coatings for your specific application needs. From sample fabrication to economical and efficient mass production, we provide a wide range of optical coating systems that cover the ultraviolet, visible, near-infrared, and infrared bands.



Metal & Crystal Processing

BOXIN has the capability to process both metals and crystals. We have introduced three state-of-the-art single-point diamond turning machines to provide professional machining services to clients. The materials involved in the machining primarily include aluminum, copper, germanium, or carbon-free crystals.



Lens Systems

BOXIN recruits highly skilled personnel from the industry to form R&D and design teams. We have independently designed over 100 different series of products, including automatic zoom high-definition lenses, infrared imaging lenses, industrial camera lenses, dual-concentric lenses, CCTV lenses, beam-expanding lenses, field lenses, and more.

Introductions

The cylindrical lenses are applied in adjust scattering light in the optical system; it can change spotlight to linear light. Cylindrical lenses have a curvature on one dimension, it's designed to shape light on one-dimension. BOXIN provides cylindrical lenses with diversified material, including crown glass, flint glass, fused silica, crystal materials, metal materials, glass ceramics, ULE, monocrystalline silicon, silicon carbide, etc.

Cylindrical lenses are used in intensive laser system and synchronized radiate beam. In recent year, the demands of cylindrical lenses are increasing rapidly, especially in high precision testing instrument and device such as high power laser and long distance linear interferometers. The product is also widely used in optical system like bar-code scanner, etc.

Representative Production Line

- ✓ More than 30 sets of self-developed CNC polishing machine
- ✓ More than 30 sets of traditional single axis polishing machine
- ✓ More than 20 sets of traditional double axis polishing machine
- ✓ 6-ditional double axis polishing machine
- ✓ Self-developed large dimension polishing machine ZM1000



Parameters

Materials	Optical Glasses, Laser Crystal, Fused Silica, Radiation Resistant Glasses, IR&UV Materials, Metal Materials, ULE, Monocrystalline Silicon, Silicon Carbide, etc.
Radius of curvature (mm)	R2 ~ R∞
Diameters (mm)	2 ~ 1200 (max width up to 650mm)
Dimension tolerance (mm)	±0.01 ~ ±0.2
Thickness tolerance (mm)	±0.01 ~ ±0.2
Scratch & dig	10/5 ~ 80/50
PV	1/20λ ~ 1/2λ @ Φ100mm
Centration	30" ~ 5' (or Δt≤0.02)
Effective aperture	>90%
Manufacturing capacity	2,000,000pcs/year
Coating features	Customizable



Large Size Cylindrical

Processing Capability

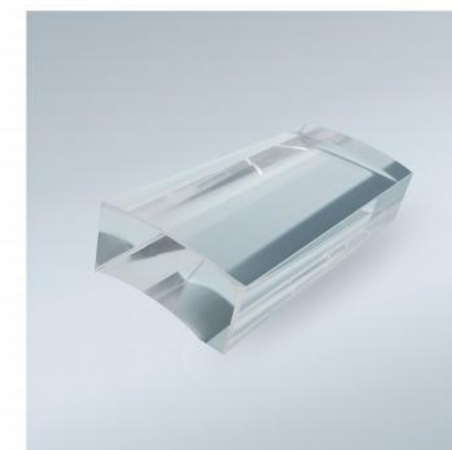
Regarding to the production capability of cylindrical lenses, BOXIN equipped with more than 100 sets of CNC grinding and CNC polishing machines, plus over 40 sets of traditional polishing machines. In terms of inspection, BOXIN equipped ZYGO® Laser Interferometers with CGH to measure the special cylindrical curvature, and equipped Digital Cylindrical Lens Centration Testing Device to measure the decenter, twist and tilt of cylindrical lens in a non-contact and no-damage way. BOXIN can process many materials for UV,VIS,NIR,FIR, etc. Process geometric dimension from 2mm to 1,200mm, width is up to 650mm. Annual output over 2,000,000pcs.



Plano Concave Cylindrical Lens

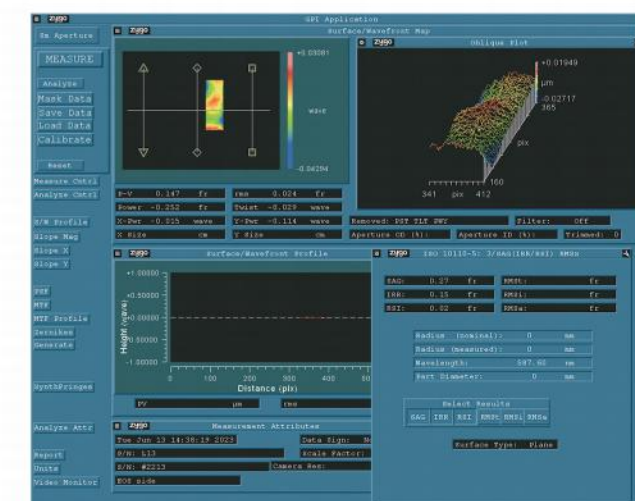
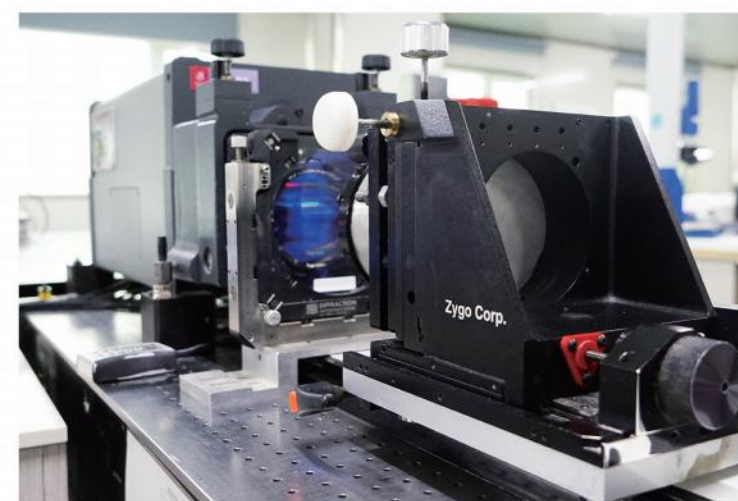


Aspheric Cylindrical Lens



Meniscus Cylindrical Lens

Product Inspection





Aspherical Lens

Introductions

Aspherical lenses are mainly using to focus light. Meanwhile, it can adjust aberration of the spherical surface. The Aspherical lens can raise the numerical aperture of a lens, and maximally reduce aberration. Aspherical lenses are also able to reduce the number of optical components which are used in a lens system.

Representative Production Line

- ✓ Satisloh® SPM-125 CNC grinding machine
- ✓ Satisloh® SPS-125 CNC polishing machine
- ✓ Satisloh® SPS-200CNC polishing machine (5-axis)
- ✓ Ultra-precision single point diamond tuning lathe



SatisLoh® SPS-200



The double main axis concept of this machine allows a flexible process with four tools (no need to change tools). It is mainly used for processing cylindrical and aspherical products including off-axis with more complex processes and higher precision requirements within $\Phi 300\text{mm}$. CNC five-axis (B,C,X,Y,Z) with multi-functional 360° rotating head can also provide free-form surface polishing and correction functions. MDP online data processing allows on-board metering for efficient online measurement of aspheres and fast & simple shape correction. The stable 3D measuring device and IQS system provide accurate quality control.

Processing Capability

Aspherical workshop equipped with advanced German-made SatisLoh® grinding & polishing machines and US-made Precitech® single point diamond tuning lathe, together with self-developed polishing machines up to a total number of 30 sets processing equipment. We also equipped Mahr® profile meter for PV inspection. Processing dimension from 10mm to 750mm, min. PV less than $0.1\mu\text{m}$, $\text{RMS} \leq 12\text{nm}$. Annual output over 50,000pcs.



Dual Concave
Aspherical Lens



Plano Convex
Aspherical Lens



Plano Concave
Aspherical Lens



Meniscus
Aspherical Lens

Parameters

Materials	Optical Glasses, Laser Crystal, Fused Silica, Radiation Resistant Glasses, IR&UV Materials, Metal Materials, etc.
Diameters (mm)	$\Phi 10 \sim \Phi 750$
Dimension tolerance (mm)	$\pm 0.01 \sim \pm 0.2$
Thickness tolerance (mm)	$\pm 0.01 \sim \pm 0.1$
Scratch & dig	20/10 $\sim$ 80/50
PV	$0.1\mu\text{m} \sim 3\mu\text{m}$
Centration	$30'' \sim 5'$ (or $\Delta t \leq 0.02$)
High-order term coefficient	18
Manufacturing capacity	50,000pcs/year
Coating features	Customizable

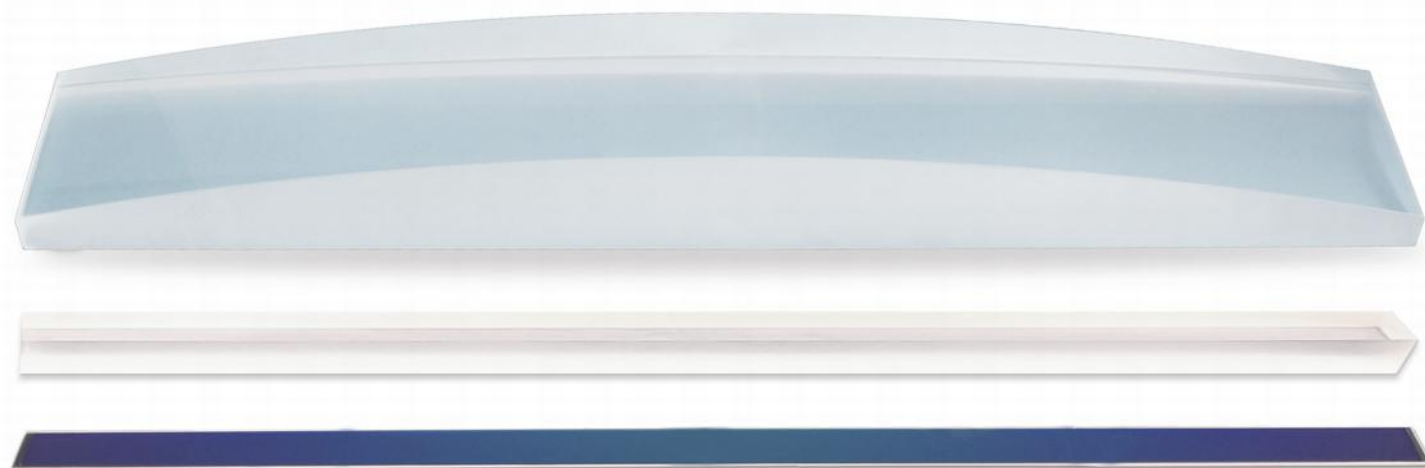




Large Dimension Optics

Introductions

Large dimension optics usually apply to the printing system, astronomical technology, high luminous flux system, large FOV system, long distance imaging system, scientific research & security system. The ultra-precision processing technology of BOXIN large dimension optical components is the comprehensive application of new achievements in a variety of disciplines, and has witnessed the development of advanced and sophisticated technologies such as civil and scientific research.



Processing Capability

The ion beam processing equipment will be used for ultra-precision machining of optical components and ion beam etching. It not only will be able to process optical materials with different characteristics such as fused silica, glass-ceramics, Si and sapphire, etc. But also could finishing surfaces such as plane, spherical, coaxial aspherical, off-axis aspherical and free form processing. The maximum machining diameter is 650mm, and the highest processing accuracy can reach $RMS=1/100\lambda$, $PV=1/30\lambda$, surface roughness Ra could reach 2-3nm.

The CNC mechanical arm processing equipment can be used for optical components grinding, rough polishing, fine polishing and other precision machining. It not only will be able to process optical materials with different characteristics such as fused silica, glass-ceramics, ULE, Si, SiC, and nickel-phosphorus alloy, etc. But also could finishing surfaces such as plane, spherical, coaxial aspherical and off-axis aspherical processing. The maximum machining diameter is 800mm, and the highest processing accuracy can reach $RMS=1/70\lambda$, surface roughness Ra could reach 2-3nm.



Materials	Optical Glasses, Crystals, Fused Silica, Glass-Ceramics, Si, Sapphire, SiC, ULE glass-ceramics, Nickel-phosphorus Silloy, etc
Processing dimension for Large cylindrical lens	1,200mm * 650mm
Processing dimension for Large flat lens	1,200mm
Processing dimension for Large spherical lens	1,100mm
Processing dimension for Large aspherical lens	φ 750mm
Processing dimension for Large toric lens	φ 300mm
RMS	<1/70λ
Ra	2-3nm
Coating features	Customizable

Representative Production Line



650mm ion beam processing equipment

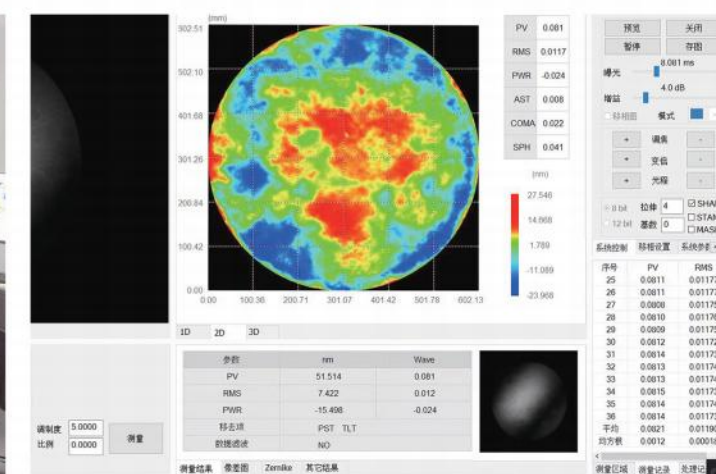


800mm CNC mechanical arm processing equipment

Product Inspection



600mm Horizontal Laser Interferometer



Inspection Result



Toroidal Lens

Introductions

A toroidal lens can be seen as an arc formed by a rotation of another arc around the axis. It is used to replace the optical lens group, simplify the instrument structure and improve the image quality. Toroidal mirrors can effectively reduce a series of image deformation problems caused by traditional plane mirrors or single spherical mirrors, it can reduce the number of lenses used in optical systems.

Parameters

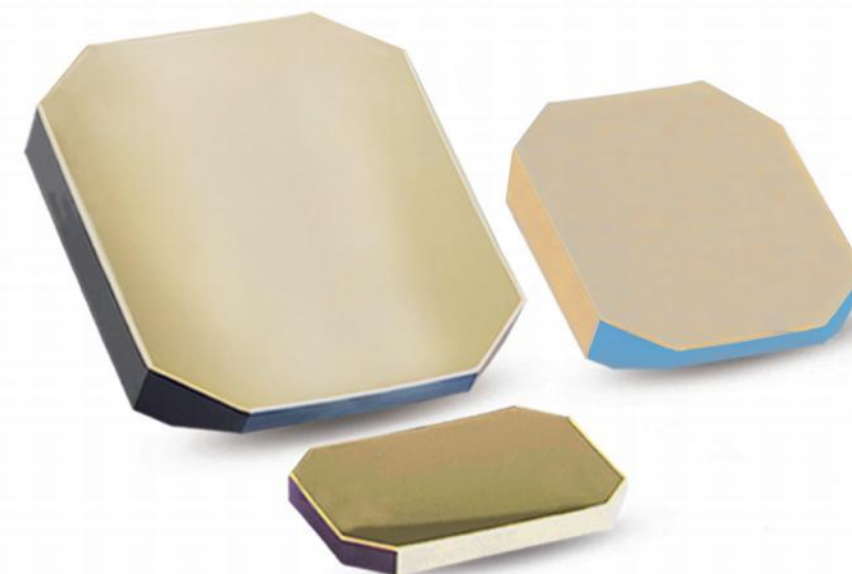
Representative Production Line

- ✓ EU imported CNC grinding machines
- ✓ Imported polishing machines
- ✓ Self-upgraded polishing machines

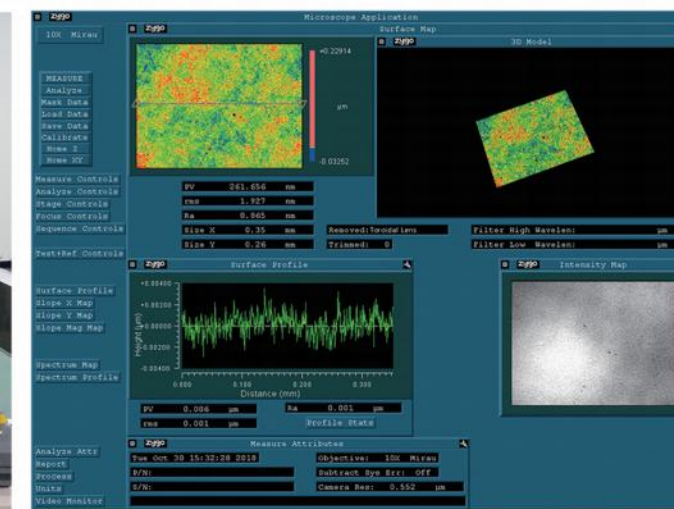
Materials	Optical Glasses, Laser Crystal, Fused Silica, Radiation Resistant Glasses, IR&UV Materials, Metal Materials, etc.
Radius of curvature (mm)	R30 ~ R ∞
Diameters (mm)	$\Phi 10 \sim \Phi 300$
Dimension tolerance (mm)	$\pm 0.01 \sim \pm 0.2$
Thickness tolerance (mm)	$\pm 0.01 \sim \pm 0.2$
Scratch & dig	10/5 ~ 80/50
PV	$1/4\lambda \sim \lambda @ \Phi 100\text{mm}$
Centration	30" ~ 5' (or $\Delta t \leq 0.02$)
Manufacturing capacity	150,000pcs/year
Coating features	Customizable

Processing Capability

BOXIN equipped with more than 30 sets of toroidal lens CNC grinding and polishing machine. We can process various materials covering VIS FIR, etc. Process range from 10mm to 300mm in diameter or length. Annual output exceed 150,000pcs.



Product Inspection





High-Precision Spherical Lens

Introductions

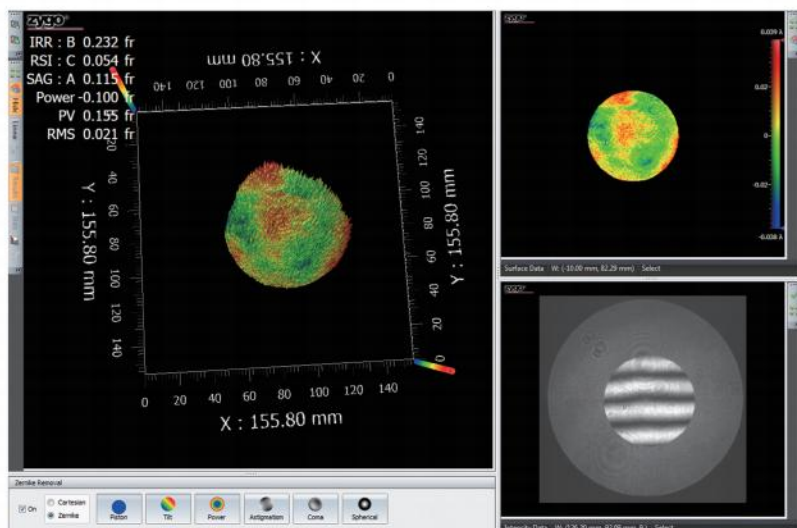
BOXIN produces various kinds of spherical lenses using in applications of the camera system, projectors, telescopes, measuring instruments, medical apparatus and instruments, optical equipment, and all kinds of the imaging systems. Our professional optical designers and processing engineers are capable of develop a satisfied solution for your demand, that either assist you to develop a new project or process the lenses according to your drawing. Please contact us now for consultation and quotation.

Representative Production Line

- ✓ CNC spherical lens polishing machine
- ✓ CNC spherical lens polishing machine QMSPK20
- ✓ 4-axis high-speed polishing machine
- ✓ Self-developed 3-axis large dimension polishing machine
- ✓ SatisLoh® SPM-55 CNC micro scale grinding machine
- ✓ SatisLoh® SPS-55 CNC micro scale polishing machine



Small size lens



Processing Capability

Besides producing various spherical lenses and cemented lens with optical glass, BOXIN also produces a various spherical lenses with crystal material. Annual output over 700,000pcs. The processing dimension range covers 1.4mm to 1,100mm.

Parameters

Materials	Optical Glasses, Laser Crystal, Fused Silica, Radiation Resistant Glasses, IR&UV Materials, Metal Materials, etc.
Radius of curvature (mm)	R0.5 ~ R ∞
Diameters (mm)	Φ 1.4 ~ Φ 5
Dimension tolerance (mm)	$\pm$ 0.005 ~ $\pm$ 0.02
Thickness tolerance (mm)	$\pm$ 0.01 ~ $\pm$ 0.05
Scratch & dig	10/5 ~ 80/50
PV	1/20 λ ~ 1/4 λ
Centration	30" ~ 5' (or $\Delta t \leq 0.005$)
Coating features	Customizable

Micro Scale



Materials	Optical Glasses, Laser Crystal, Fused Silica, Radiation Resistant Glasses, IR&UV Materials, Metal Materials, etc.
Radius of curvature (mm)	R3~ R ∞
Diameters (mm)	Φ 5 ~ Φ 130
Dimension tolerance (mm)	$\pm$ 0.005 ~ $\pm$ 0.05
Thickness tolerance (mm)	$\pm$ 0.01 ~ $\pm$ 0.1
Scratch & dig	10/5 ~ 80/50
PV	1/20 λ ~ 1/4 λ
Centration	10" ~ 5' (or $\Delta t \leq 0.01$)
Coating features	Customizable

Standard Scale

Materials	Optical Glasses, Laser Crystal, Fused Silica, Radiation Resistant Glasses, IR&UV Materials, Metal Materials, etc.
Radius of curvature (mm)	R65 ~ R ∞
Diameters (mm)	Φ 130~ Φ 1,100
Dimension tolerance (mm)	$\pm$ 0.01 ~ $\pm$ 0.2
Thickness tolerance (mm)	$\pm$ 0.01 ~ $\pm$ 0.2
Scratch & dig	10/5 ~ 80/50
PV	1/10 λ ~ 1/2 λ @ Φ 100mm
Centration	30" ~ 5' (or $\Delta t \leq 0.02$)
Coating features	Customizable

Large Scale



Flat Optical Components

Processing Capability

Besides standard H-K9L optical glass, BOXIN can also produce plano optical components with materials like CaF₂, ZnSe, BaF₂, ZnS, Germanium, Si, Sapphire, etc. Our annual output is around 500,000pcs. BOXIN's plano processing equipment include self-developed CNC 800 large plano grinding machines, 2,500mm / 2,000mm / 1,500mm / 1,000mm large ring swinging polishing machines, 1,000mm segregators, double sides polishing machines. All of the equipment assured that BOXIN could supply high quality plano products to our worldwide customers.

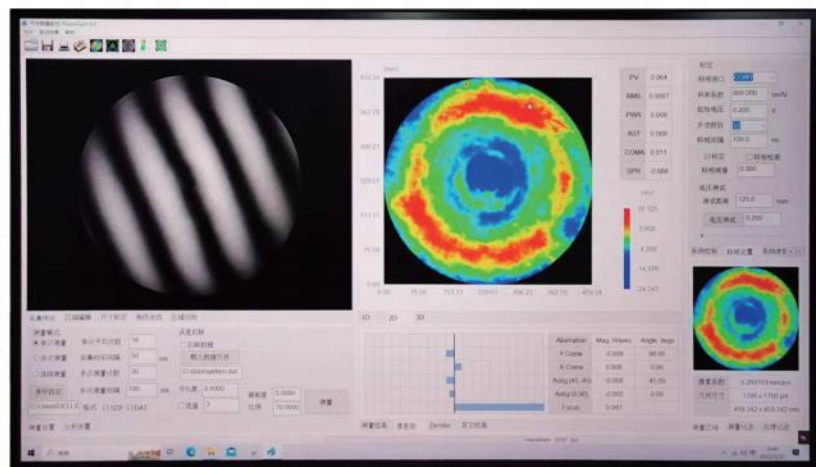
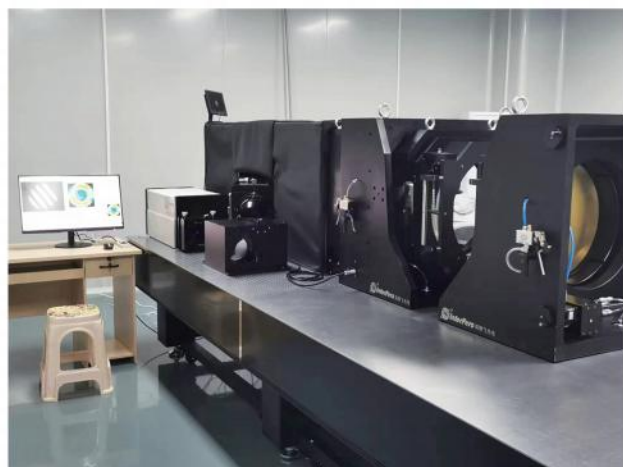
Representative Production Line

- ✓ CNC 800mm large plano grinding machine
- ✓ 2,000mm large ring swinging polishing machine
- ✓ 1,000mm segregator
- ✓ Double sides polishing machine

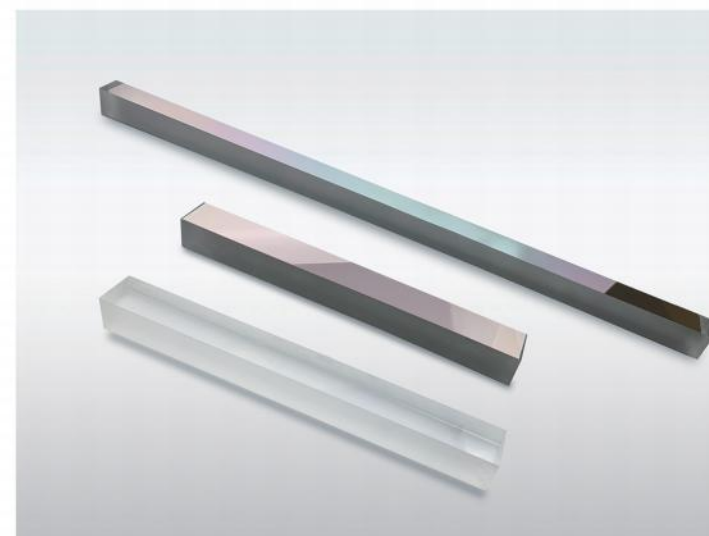


Self-developed plano polishing machine

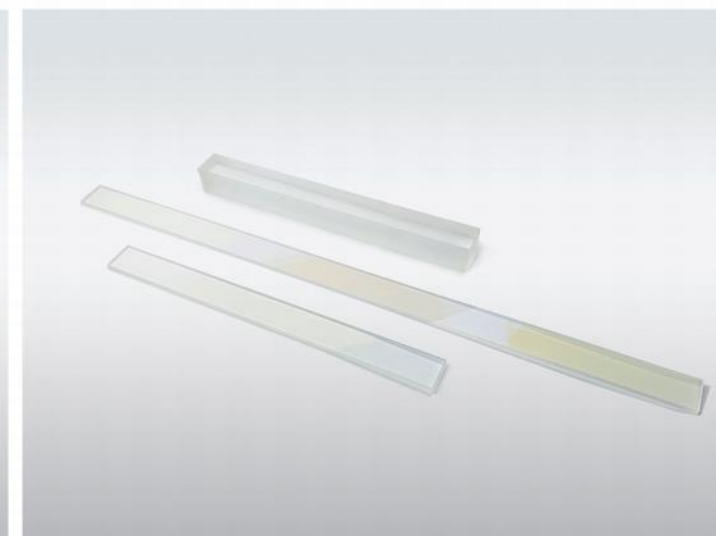
Product Inspection



Typical Products



Large dimension plano reflectors
720 X 35 X 35mm
350 X 35 X 35mm



Large dimension plano optics
350 X 35 X 35mm
720 X 35 X 5mm
390 X 35 X 5mm

Parameters

Materials	Optical Glasses, Laser Crystal, Fused Silica, Radiation Resistant Glasses, IR&UV Materials, Metal Materials, etc.
Diameters (mm)	Φ1.8 ~ Φ1,200
Dimension tolerance (mm)	±0.005 ~ ±0.2
Thickness tolerance (mm)	±0.01 ~ ±0.2
Scratch & dig	10/5 ~ 80/50
PV	1/20λ ~ λ @ Φ100mm
Parallelism	10" ~ 5'
Manufacturing capacity	500,000pcs/year
Coating features	Customizable





High-Precision Prism

Introductions

BOXIN provides a large quantity of prisms in the field such as the laser, laser cutting, printing, labeling, etc. Our unique tooling and fixtures manufacturing and strict internal control shall guarantee the quality of our prisms. Our professional optical designers and processing engineers are capable of developing a satisfied solution for your demand.

Representative Production Line

- ✓ 4-axis high-speed polishing machines
- ✓ 2-axis polishing machines
- ✓ Self-developed 2-axis large size polishing machines
- ✓ Self-developed 3-axis large size



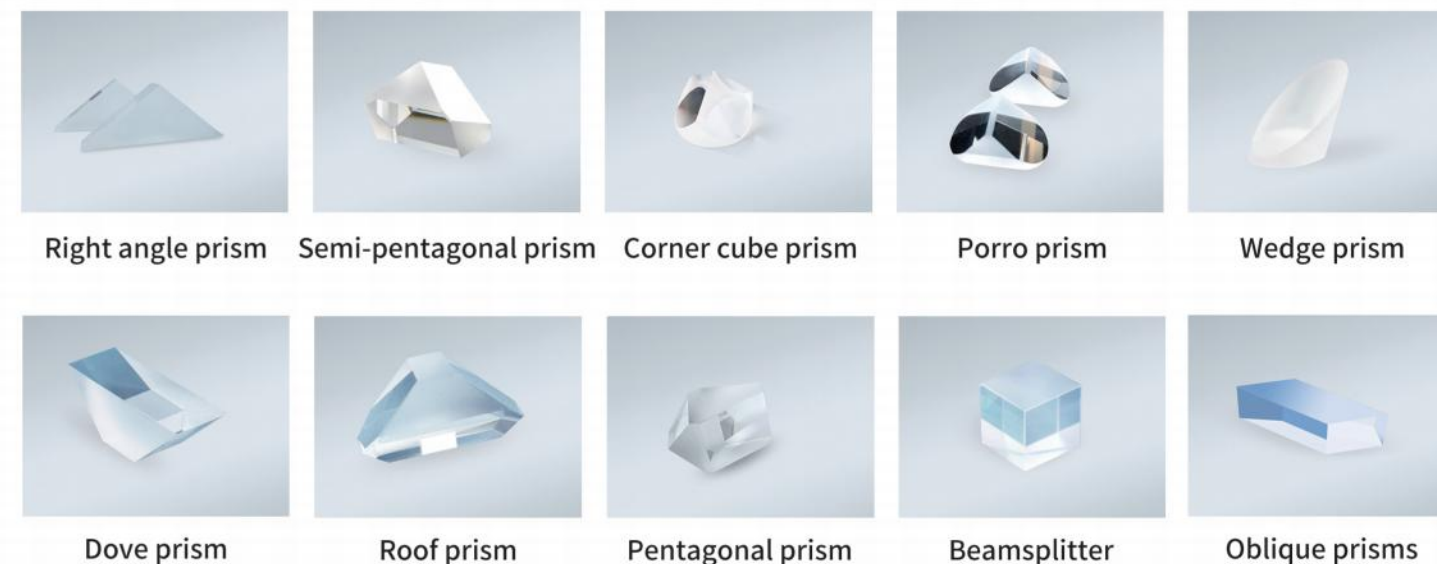
Parameters

Materials	Optical Glasses, Laser Crystal, Fused Silica, Radiation Resistant Glasses, IR&UV Materials, Metal Materials, etc.
Dimensions (mm)	3~ Φ500
Dimension tolerance (mm)	±0.005 ~ ±0.2
Scratch & dig	10/5 ~ 80/50
PV	1/20λ ~ λ @ Φ100mm
Angel deviation	3" ~ 5'
Coating features	Customizable

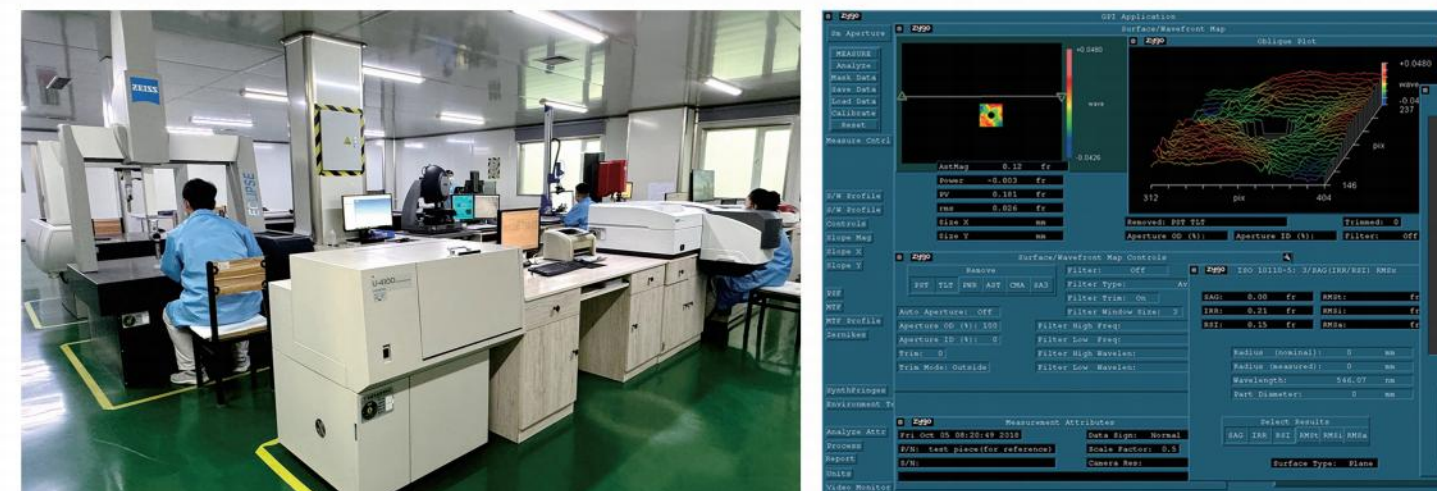


Processing Capability

BOXIN could provide various kinds of prisms including rectangular prism, cubic prism, pentagonal prism, dove prism, roof prism, oblique prism, etc. The processing range covers 3mm to 500mm, the minimum process angle deviation is 3".



Product Inspection





Coating Capability

BOXIN high-performance coating can satisfy your multiple application demands; we design, research, and produce high-performance optical coating from sample trial production to efficient batch production. BOXIN supplies various coatings such as VIS, IR, NIR, UV waveband; including AR coating, metal coating, beam splitting coating, high-reflection coating, IR coating, UV coating, semi-reflection coating, filter coating, laser crystal coating, etc.



Coating Production Line

BOXIN coating technique guarantees the most advanced optical components are used in the most comprehensive applications. Our coating laboratory has one set of German made Leybold® coating machine, one set of Oporun® coating machine and one set of Ulvac® magnetron sputtering coating machine from Japan, three sets of LUNG PIEN® (Taiwan) coating machine and five sets of domestic coating machine together with ultrasonic cleaning machines. BOXIN's professional coating engineer team shall provide suggestions and support regarding to your need, and assist you in finding an optimal coating design or finished product, which is suitable for your particular application.



Oporun coating machine

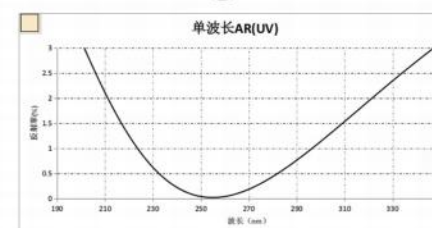


Leybold coating machine



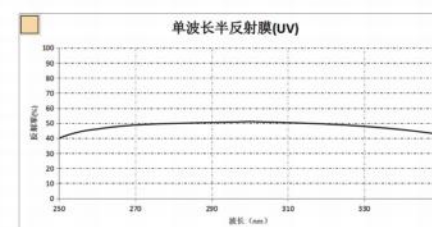
Ultrasonic cleaning machine

AR Coating



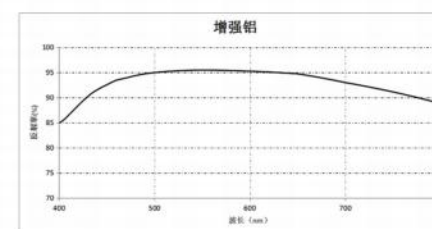
- $193\text{nm} \leq \lambda \leq 400\text{nm}$, high performance in resistance to damage of laser power.
- Single wavelength AR(UV) Significantly reduce the surface reflectance at a given center wavelength, the AR coating is not only durable but also has strong resistance to the laser energy.
- Single wavelength AR(VIS/VIR)
- 400nm wavelength is available for the laser applications.
- Single wavelength AR(VIS/VIR) Reduces surface reflectance to less than 0.25% at specified center wavelength and normal incidence. Because AR(VIS/NIR) adopts special materials to suffer higher power than standard narrowband reflective film, thus it is more suitable for the laser applications.

Semi-Reflective Coating

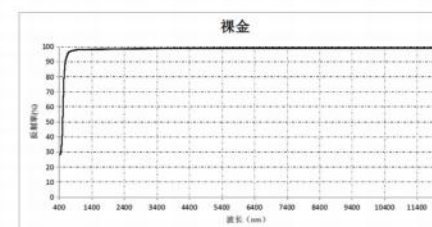


- $222\text{nm} \leq \lambda \leq 400\text{nm}$
- high performance in resistance to damage of laser power.
- Single wavelength semi-reflective film(UV), The monochromatic incident beam can split into reflection and projection components with a specified intensity ratio; It is not only durable but also has strong resistance to the laser energy. Beside this, it also resists the corrosion of excimer gas. Thus it is an ideal film for the core application. Meanwhile, it uses in the beam splitting and laser output coupling.

Metal Coating

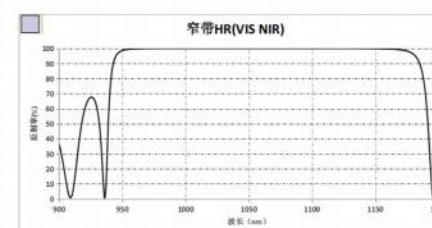


- The durability accord the MIL-SPEC request, and we can coat regarding customers request.
- The enhanced aluminum coating optimizes a specific wavelength reflectance. Compare with the protective aluminum coating; the enhanced aluminum coating is more sensitive of the wavelength, the incident angle, and the polarization. In the 193nm, the UV enhanced supplies at 86% reflectance. Through we are coating more layers, we will get better reflectance. The Gold film suitable for various optical components, and we customized the film regarding customers request.



- The gold coating in the near infrared, mid-infrared and far-infrared has extremely reflectance.
- Gold is inert in the air, thus it ideal for the harsh environment, for example, DF and HF laser cores. The gold does not oxidation, therefore, it does not need to protect film. However, the gold is easy to get a scratch, we only use the solvent cleaning or the low pressure with dry air to clean.

High Reflective Coating



- $400\text{nm} \leq \lambda < 2.0\mu\text{m}$
- Narrow band HR (VIS/NIR) supplies maximum reflectance, meanwhile, because of the absorption and scattering has very low loss. The narrow band HR(VIS/NIR) use special materials to suffer the higher power more than the standard RMAX mirror layer.

*FOR MORE COATING PRODUCT DETAILS, PLEASE CONTACT OUR SALES ENGINEER.

Introductions

The application of metal & crystal optics are mainly focusing on the Scientific research, experimentation and industrial field. BOXIN has the ability to process metal and crystal products. In order to provide our customer with professional services, we imported three internal leading machines of single point diamond tuning lathes. The processing materials include aluminum, copper, germanium and other crystal without carbon content. Processing equipment including 30 sets of CNC grinding/polishing machine, 3 sets of single point diamond tuning lathe; 3 of the 10 coating machines are using for IR and UV waveband coating.

Processing Capability

Materials	Laser Crystal, Fused Silica, Radiation Resistant Glasses, IR&UV Materials, Metal Materials, etc.
Customized shapes	Sphere, Asphere, Free-form, etc
Dimension range(mm)	5 - 330
Precision	0.1 μ m



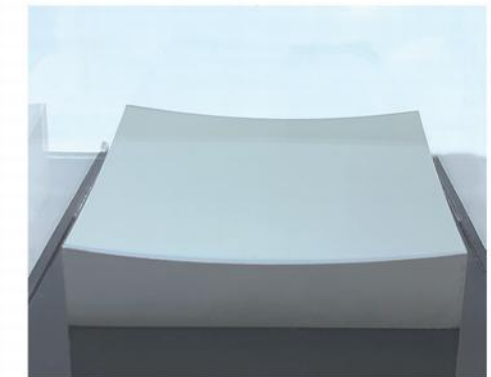
Representative Production Line



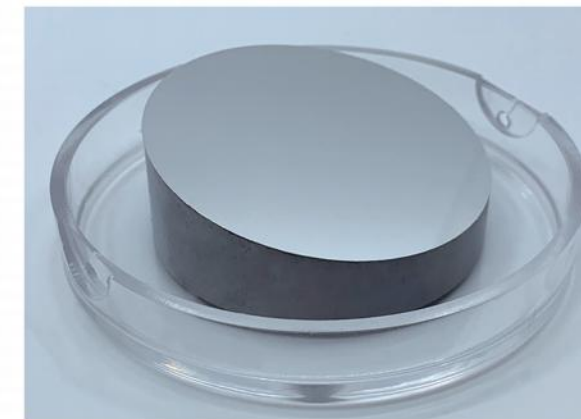
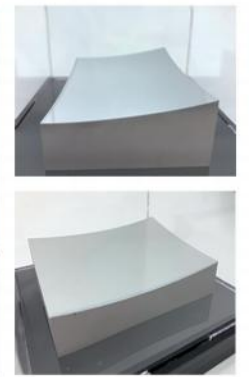
Typical Products



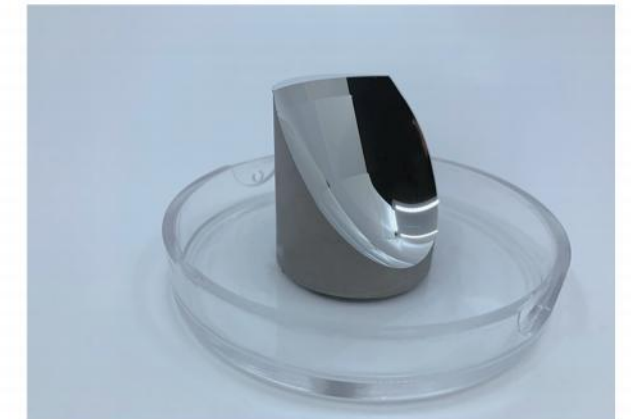
Crystal aspherical lens



Free-form lens



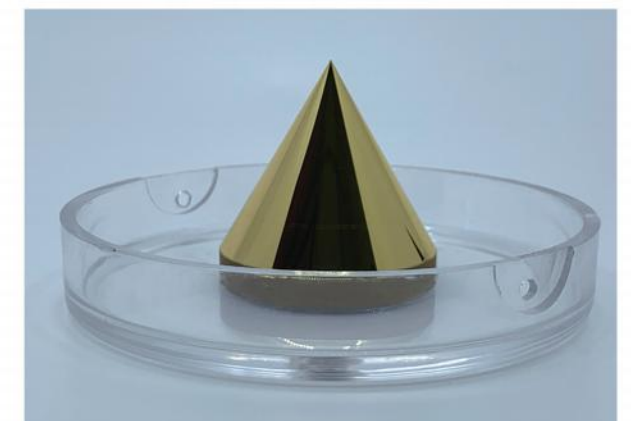
Wedge mirror



Off-axis mirror



Parabolic mirror



Cone mirror



Optical Lens Customization



Introductions

Boxin has the ability to independently R&D various industrial lenses, also could design and customize special industrial lenses according to customer needs. The company is equipped with advanced production lines and inspection lines, it has customized related products for industrial enterprises from all over the world, which has been praised by the industry.

The double telecentric lens can achieve a large depth of field, minimal distortion, and provide different magnification from 0.04 times to 2 times, and can also be customized according to your needs of different magnification, different working distance of non-standard telecentric lens. The continuous zoom lens has a wide focal length coverage, basically covering all the focal length requirements in the application field of telephoto lenses. The products have high image resolution, high parfocality, extremely high optical axis consistency and stability, together with a wide operating temperature range, the temperature difference between the two poles exceed 100°C.

Key Parameters For Continues-Zoom Lens

Focus Range	Target Size(Diag.)	Aperture Range	Distortion (%)	Weight (kg)	TTL (mm)
6.9-100mm-FF	8.9mm	F3~F5	-8%~7%	<0.5	98
24-120mm	6.9mm	F3.6~F5	1.8%~2%	0.42	110
10-150mm	7.8mm	F3.2~F5.3	-1.2%~-2%	0.52	116
10-230mm	6.9mm	F3.6~F5.8	5%~-4%	1.3	189.89
10-300mm	7.6mm	F3.5~F6.5	4%~-3.5%	1.3	187
25-500mm-M	6.8mm	F3.6~F7.3	2.2%~1.2%	2.3	275
18-500mm-S	11mm	F6~F10.9	1.6%~-1%	1.5	205
14-750mm	8.9mm	F4~F7.5	1%~-3.5%	5.5	392.88
14-800mm	11mm	F5.8~F11.8	-5%~2%	3	298
14-850mm	8.9mm	F5.7~F11	2%~-2%	3.15	317.736
25-1200mm-F10	12.116mm	F4.8~F10	4%~2%	<7.5	471.70
25-1200mm-F12	11mm	F5.7~F12	0.9%~-1%	5.5	397.88
14-240mm	17.6mm	F3.2~F5.5	-5%~5%	<5	239
25-500mm-B	16mm	F2.8~F5	4%~1.8%	<6	394.8
40-500mm-FF	42.6mm	F3.6~F5	2%~-5%	<5	367.8
500-1000mm-TG	22mm	F3.1~F5	<0.2%	15	496
120-1200mm-B	30.2mm	F3.7~F6	1.9%~-2%	<13	885.4
1500mm	22mm	F12.5	0.5%	8	344
32-1500mm	16.9mm	F5.2~F10	1%~5%	13	615
200-2000mm	43.2mm	F6.2~F10	0.5%~0.5%	33	985
500-2500mm	20mm	F2.8~F10	<0.3%	<30	874

*Please read our telephoto lens manual for more detail parameters.

Parameters For Double Telecentric Lens

Part#	Magnification (x)	Field Of View							Working Distance (mm)	Working F-number	Telecentricity (deg)	Distortion (%)	CTF @70 lp/mm (%)	Image side N.A.	Object side N.A.	Mount
		1/4" (3.6 x 2.7) detector	1/3" (4.8 x 3.6) detector	1/2.5" (5.7 x 4.28) detector	1/2" (6.4 x 4.8) detector	1/1.8" (7.13 x 5.37) detector	2/3" (8.45 x 7.07) detector	2/3" (8.8 x 6.6) detector								
TC 23 004	2.000	1.80 x 1.35	2.40 x 1.80	2.85 x 2.14	3.20 x 2.40	3.56 x 2.68	4.22 x 3.53	4.40 x 3.30	56.80	11.1	<0.1	<0.1	>30	0.045	0.090	C
TC 23 007	1.334	2.69 x 2.02	3.59 x 2.69	4.27 x 3.20	4.79 x 3.59	5.34 x 4.02	6.33 x 5.30	6.59 x 4.94	60.80	11.1	<0.1	<0.1	>30	0.045	0.060	C
TC 23 009	1.000	3.60 x 2.70	4.80 x 3.60	5.70 x 4.28	6.40 x 4.80	7.13 x 5.37	8.45 x 7.07	8.80 x 6.60	62.60	11.1	<0.1	<0.1	>25	0.045	0.045	C
TC 23 016	0.528	6.8 x 5.1	9.08 x 6.81	10.79 x 8.10	12.1 x 9.08	13.50 x 10.16	16.00 x 13.38	16.66 x 12.49	45.20	8	<0.1	<0.1	>30	0.062	0.033	C
TC 23 024	0.350	10.26 x 7.70	13.69 x 10.26	16.26 x 12.20	18.25 x 13.69	20.34 x 15.31	24.10 x 20.17	25.10 x 18.82	69.20	8	<0.1	<0.1	>45	0.062	0.022	C
TC 23 036	0.243	14.77 x 11.07	19.69 x 14.77	23.38 x 17.55	26.25 x 19.69	29.24 x 22.02	34.65 x 28.99	36.09 x 27.07	102.10	8.1	<0.1	<0.1	>40	0.062	0.015	C
TC 23 048	0.184	19.5 x 14.6	26.0 x 19.5	30.9 x 23.2	34.7 x 26.0	38.7 x 29.1	45.9 x 38.4	47.8 x 35.8	134.6	8	<0.1	<0.1	>40	0.059	0.011	C
TC 23 056	0.157	22.9 x 17.2	30.6 x 22.9	36.3 x 27.2	40.8 x 30.6	45.4 x 34.2	53.8 x 45.0	56.1 x 42.0	159.20	8	<0.1	<0.1	>45	0.062	0.010	C
TC 23 064	0.138	26.0 x 19.5	34.7 x 26.0	41.2 x 31.0	46.3 x 34.7	51.6 x 38.8	61.2 x 51.2	63.7 x 47.8	182.10	8	<0.1	<0.1	>50	0.062	0.009	C
TC 23 072	0.123	28.2 x 21.1	37.6 x 28.2	44.7 x 33.5	50.2 x 37.6	55.9 x 42.1	66.3 x 55.4	69.0 x 51.8	227.70	8	<0.1	<0.1	>40	0.062	0.008	C
TC 23 085	0.104	35.1 x 26.3	46.8 x 35.1	55.6 x 41.7	62.4 x 46.8	69.5 x 52.3	82.4 x 68.9	85.8 x 64.3	280.60	8	<0.1	<0.1	>45	0.062	0.007	C
TC 23 096	0.094	38.1 x 28.6	50.8 x 38.1	60.3 x 45.3	67.8 x 50.8	75.5 x 56.9	89.5 x 74.9	93.2 x 69.9	279.30	8	<0.1	<0.1	>50	0.062	0.006	C
TC 23 110	0.079	45.2 x 33.9	60.3 x 45.2	71.6 x 53.7	80.4 x 60.3	89.5 x 67.4	106.1 x 88.8	110.5 x 82.9	336.50	8	<0.1	<0.1	>40	0.062	0.005	C
TC 23 120	0.072	50.0 x 37.5	66.7 x 50.0	79.2 x 59.5	89.0 x 66.7	99.1 x 74.6	117.5 x 98.3	122.4 x 91.8	336.50	8	<0.1	<0.1	>35	0.062	0.044	C
TC 23 130	0.068	52.9 x 39.7	70.6 x 52.9	83.8 x 62.9	94.1 x 70.6	104.9 x 79.0	124.3 x 104.0	129.4 x 97.1	398.00	8	<0.1	<0.1	>40	0.062	0.004	C
TC 23 144	0.061	58.9 x 44.2	78.6 x 58.9	93.3 x 70.1	104.8 x 78.6	116.7 x 87.9	138.4 x 115.8	144.1 x 108.1	398.00	8	<0.1	<0.1	>40	0.062	0.004	C
TC 23 172	0.050	71.7 x 53.7	95.6 x 71.7	113.5 x 85.2	127.4 x 95.6	142.0 x 106.9	168.3 x 140.8	175.3 x 131.4	531.00	8	<0.1	<0.1	>40	0.062	0.003	C
TC 23 240	0.037	97.2 x 72.9	129.6 x 97.2	153.9 x 115.5	172.8 x 129.6	192.5 x 145.0	228.2 x 190.9	237.6 x 178.2	500.00	8	<0.1	<0.1	>60	0.062	0.002	C





Qualification And Reward

Exhibition Photograph Album

